QUESTIONS & ANSWERS

Lisa
AppleNet
A.C.C.
Datacommnications

General Questions and Answers

1. Describe the POS division.

The Personal Office Systems Division was formed to design and market advanced computer products for the office market.

2. What is this division's charter?

Its charter is to create and serve the personal office systems marketplace with innovative computer hardware, software, literature, training materials, service, and support.

3. When was this division formed?

September 1980.

4. Who is managing this division?

John Couch, Vice President and General Manager. Reporting to Couch are Wayne Rosing, Director of Engineering; Deme Clainos, Director of Marketing; Dave Craft, Director of Manufacturing; Ed Unkart, Conroller; Pete Cressman, Manager of Software Quality Assurance.

5. Did this division develop the Lisa?

Yes. POS designed all hardware, software, manuals, and training materials, and continues to support the manufacturing effort.

6. When did development begin?

January 1980.

7. Was the Lisa developed in response to competition?

No. The Lisa was developed to position Apple well beyond the competition and to ensure our long term success. The Lisa is the the result of an effort to bring highly advanced software and hardware technology to one of the most promising markets available: the office.

8. Describe the Lisa computer.

The Lisa is a revolutionary computer system that's powerful and easy to use. It helps office executives, managers, professionals, and secretaries make better decisions and communicate more effectively.

The Lisa's user interface is one of the keys to its success. One controls the machine by using a pointing device, called a mouse, to select operatings or modify information on the screen. The Lisa's bit-mapped display presents graphical images of familiar desktop objects. These images, called icons, are simpler and more intuitive than plain text.

The system is based on the MC68000 microprocessor, one of the most powerful CPUs invented. Lisa comes with one-megabyte of memory, as well as two high-density floppy disk drives, and a five-megabyte hard disk.

Standard with the Lisa system are six integrated software applications: LisaWrite, an easy to use word processor; LisaCalc, a sophisticated spreadsheet; LisaGraph, a package that turns raw numbers into meaningful charts and graphs; LisaDraw, a graphics editor used to augment words with pictures and charts as well as create presentation materials; LisaProject, a novel project scheduling system that allows managers to play 'what-if' with schedules, tasks, and resources; and LisaList, a personal database to manage information. A seventh application, LisaTerminal, enables Lisa to act as an ordinary terminal to communicate with other computer systems.

9. Why was the name Lisa chosen?

Lisa: Local Integrated Software Architecture

Local: The Lisa embodies the one person, one computer concept of personal computing. People should have their own machines, not just a share of some complex entity at the other end of a computer cable. Integrated: The Lisa has seven applications that work together. They share a common user interface and many of the same functions, so you only have to learn one way of doing things. Integration also means that you can move information from one application to another, to graph the results of a spreadsheet analysis, for example. Software: The key to the Lisa revolution is innovative software. Software distinguishes Lisa from traditional computers. Architecture: The entire system -- hardware, operating system, and applications -- was designed to support the advanced user interface as well as to support future expansion.

10. When was the Lisa introduced?

January 19, 1983

11. How much will the Lisa cost?

The Lisa Office System, including one megabyte of main memory, two high-density floppy disk drives, the 5-megabyte ProFile hard disk, and the six software applications has a suggested retail price of $9995.

12. Why is the Lisa so expensive?

It's not. The Lisa is an advanced office workstation complete with integrated software at a suggested retail price of $9995. Note that almost all other computers would cost well over $10,000 if they had one-megabyte of memory, a 5-megabyte hard disk, six application programs, an advanced operating system, and a high-resolution bit-mapped display. In fact, many systems can't even support this capacity.

13. When will the Lisa ship?

Spring 1983

14. When will Apple be in full production?

Apple will be in full production with the Lisa in June, 1983.

15. How will this product be positioned vis-a-vis other Apple products?

The Lisa is a full-function personal computer for the office. The Apple II is a low-cost, versatile, general-purpose system. The Apple III is a more powerful, general-purpose computer aimed at the small business and professional markets.

16. Will the Lisa be compatible with any other Apple machines?

There are different levels of compatibility. The Lisa won't run Apple II/III software directly because it is based on a different, more powerful central processor. However , the Lisa does support Pascal and BASIC as do the Apple II and III, so programs written in these languages can be easily ported from one system to another.

17. What markets is the Lisa aimed at?

The Lisa is primarily aimed at the office market. A secondary focus is small business.

18. Are these Apple II and III markets?

Apple II and III, as general-purpose machines, also participate in these markets.

19. How does Apple plan to position its product line in similar markets?

Apple II, III, and the Lisa each offer different price and performance benefits. Several products in the same market need not lead to confusion; rather, Apple is offering a broad product line and allowing customers to choose the best system for their particular needs.

20. Specifically, who are the targeted Lisa users?

Office managers, professionals, executives, and administrative personnel who require a total office workstation, not just a word processor or spreadsheet tool, to make better decisions and communicate more effectively.

21. What are the key user benefits of the Lisa?

* Ease of use through graphics and mouse technology
* More effective communications and decision-making through seven powerful, integrated software tools supported by a sophisticated CPU, lots of memory (one-megabyte) and mass storage.
* Room to grow with open ended software architecture, expansion slots, and input/output connections.

22. What machines are the Lisa's key competitors?

Other personal computers aimed at the office market: specifically the IBM Personal Computer, and product offerings from Wang, DEC, and Xerox.

23. What is the Lisa's competitive advantage over these systems?

* The Lisa is dramatically easier to use.
* The software applications are more powerful than their competitive counterparts.
* Few, if any competitors have project scheduling or graphic editor equivalents.
* The Lisa has more power and capacity to handle larger tasks.
* Lisa has a better hardware foundation (an advanced MC68000 CPU, and one-

megabyte of memory).

24. Has the Lisa lost its "window of opportunity" owing to introduction delays?

No. The Lisa is a revolutionary product providing a level of software integration never before attained in a personal computer. Since nothing else on the market comes close to this functionality, the Lisa will certainly be very competitive.

25. Specifically, what technical advances does Lisa represent?

A radically innovative user interface and application integration yielding an easy to use and powerful system at a desktop price.

26. Is it new technology or competitor's technology?

Apple has taken the fundamental concepts that Xerox pioneered, enhanced them, and delivered them cost-effectively to the office end-user. Specifically, we developed a new operating system, a graphics package, and novel applications to produce a total office system for the knowledge worker. We also applied Apple engineering and manufacturing know-how in order to mass produce an extremely complex computer.

27. What microprocessor is used in the Lisa?

The MC68000 -- one of the most advanced CPUs invented.

28. What other state-of-the-art hardware exists in the Lisa — drives, chips, etc?

The floppy disk drives were developed by Apple to achieve high density and high reliability. There are a total of four microcomputers in the machine: one dedicated to the disk drives, one controlling the keyboard, and another to aid the 68000 in decoding keyboard and mouse signals and to keep track of the time of day. There is a sophisticated communications chip in Lisa, allowing the system to work with a wide variety of modems, printers, and other computers. There is also a hardware memory management unit, a circuit that lets the machine run many programs at the same time.

29. What were the reasons for choosing each?

See Hardware Questions and Answers below.

30. What operating system runs on the Lisa?

The computer uses the proprietary Lisa Operating System which was designed especially for the innovative user interface. The machine can support others, however, and CP/M and Xenix will be available.

31. Why did Apple choose this operating system over others?

The Lisa Operating System was designed to support the user interface. Examples of the Lisa specific features include a highly redundant file system to ensure reliability and a mechanism called non-preemptive scheduling that synchronizes the way multiple applications work together on the screen.

32. What are its advantages?

The Lisa OS is a single-user, multi-process operating system. It's designed to support the user interface as described above; it lets one person (single-user) do many things (multi-process) at once.

33. What peripherals will be available with the Lisa?

The Lisa uses the Apple ProFile 5-megabyte hard disk drive, the Apple Dot Matrix Printer, and the Apple Daisy Wheel Printer.

34. What is the cost of these peripherals?

A ProFile disk comes with every Lisa Office System; it's price is included in the system cost. Additional ProFiles are available at a suggested retail price of $2195 each. The Dot Matrix Printer retails for $695, and the Daisy Wheel Printer lists for $2195.

35. What application software will be available at introduction?

The Lisa comes with six integrated software applications: LisaWrite, LisaCalc, LisaGraph, LisaDraw, LisaProject, and LisaList. A seventh application, LisaTerminal, enables Lisa to act as an ordinary terminal to communicate with other comuter systems. LisaTerminal is available separately.

36. How much will this software cost?

The six applications are included with every Lisa system. LisaTerminal lists for $295.

37. What does the term software integration mean?

Integration means that Lisa's applications share a common user interface, so that once you've learned one, you can learn the others more easily. Integration also means that you can move information from one application to another (to graph the results of a spreadsheet analysis, for example) and between Lisa and other computers.

38. Specifically, what software is integrated?

In the sense of a common user interface, all the software is integrated. In the sense of passing data among applications, LisaCalc can move data to LisaGraph, LisaGraph can move graphs to LisaDraw, LisaProject can also move charts to LisaDraw, and LisaTerminal can move information to and from LisaWrite. In addition most documents of the same type can exchange data, so one can pass information between different LisaWrite documents, for example.

39. If some software is not integrated, why not?

Certain aspects of integration don't make sense, such as moving a pie chart into a LisaCalc cell. Additional integration will be supported in future releases.

40. Will this software be integrated eventually?

Yes: the meaningful forms of integration will be implemented.

41. Was the current Lisa software developed in-house?

Yes.

42. Is there a master plan for what kinds of software have been and will be developed for the Lisa? What is it?

Yes. We are committed to providing additional hardware and software for the office market. Areas of development include enhancing existing applications, developing new ones, creating network products, and software development tools.

43. Are outside software developers developing software for the Lisa?

Yes, outside developers have been involved for over a year.

44. Who are these developers?

MicroFocus (COBOL), Microsoft (Xenix), and Digital Research (CP/M).

45. What kinds of software are they developing?

These companies are developing additional languages and operating systems, as well as applications for the small business market.

46. When will this software be available?

New hardware and software products for Lisa will be available in the coming months.

47. What has been Apple's relationship with Lisa software developers?

Apple has had an excellent track record with software developers for the Lisa. We've released preliminary manuals and have had Technical Support Engineers available for software support for almost two years prior to announcement.

48. What software is being developed by Apple? By third-party developers?

Apple has chosen to concentrate on developing application and system software most vital to the office market. We are looking to third-party developers to provide software for more specialized segments of this market and for other markets.

49. Who will be selling the Lisa system?

We'll be selling the Lisa through a limited number of current Apple dealers as well as through Apple's National Account program.

50. Are there any changes in your distribution system?

The distribution mechanism that will support Lisa has been in place servicing Apple II/III products for quite some time.

51. Will a direct sales force be used?

The National Account Program is similar to a direct sales force. Apple account execs call on major accounts and coordinate the sale and service of equipment through the dealer base.

52. How many National Account Representatives will be involved?

Apple expects to have 60 National Account Program Executives in the field by March 1983.

53. How many dealers will be prepared to sell the Lisas at introduction?

About 130.

54. What are the sales projections for the Lisa in '83, '84?

Confidential.

55. How will the Lisa sales affect the II and III?

Overall, the Apple II and Apple III product lines should be positively affected by the Lisa, as customers realize the strength of Apple and its commitment to the office marketplace. Some customers may find that they prefer the Lisa, but others will be drawn toward Apple because of the comprehensive range of products.

56. What are current II sales? III sales?

Confidential.

57. Will the expected MacIntosh product compete with the Lisa? Will MacIntosh be compatible with the Lisa?

MacIntosh is not an announced product.

58. With the Lisa and the Apple III selling into the same markets, will the Apple III remain a viable machine?

The Apple III is certainly a viable product. Although it doesn't have the innovative Lisa user interface, it does support the important office tools of a conventional personal computer at a lower price than the Lisa. It also provides users with a wide array of peripherals and software for small business and other markets.

59. Why doesn't Apple introduce the Lisa when it can ship?

We set the future direction of the company at the annual shareholders' meeting. In addition, third-party developers are being encouraged to consider the Lisa in their plans.

60. What won't be working at introduction?

Nothing. The hardware design has been stable for over a year and a half, and almost 1,200 systems have already been built. Over two hundred systems have been used to gather long-term reliability data and have verified Lisa's quality design. Most of the software features were completely implemented nearly a year prior to shipment. Since then, our engineers have been enhancing reliability and performance.

61. What products will be available at ship-time?

The Apple Office System plus LisaTerminal, three development languages (BASIC-Plus, COBOL, and Pascal), the Dot Matrix and Daisy Wheel Printers, and the Parallel Interface Board. Additional software (from third-party developers) may also be available.

62. Has Apple had to scale down what they wanted to put into this machine?

No. In fact, the Lisa product announced this year has many hardware and software features that weren't planned three years ago.

63. When will AppleNet be available?

Late 1983.

64. When will 3270 products be available?

Late 1983.

65. When can new developers get machines?

Developers will get high priority in the early stages of production.

66. When and where can I see a Lisa?

Demonstration units will be shipped to Apple's POS Dealers and regional offices by mid-March.

67. How can I get more information about Lisa?

Contact an Apple POS Dealer. Customers interested in the National Account Program should contact the nearest regional Apple office.

Hardware Questions and Answers

1. What processor does Lisa use?

Lisa uses the MC68000: one of the most advanced microcomputer chips made. The 68000's instruction set enables it to easily support sophisticated operating systems and high level languages, and it's comparable to many mid-size computers in speed and power. Incidentally, Lisa has three other processors besides the 68000 which are used to perform various input, output, and control functions inside the system.

2. Is the 68000 a 16 bit or a 32 bit processor?

The MC68000 can be considered both a 16 bit and a 32 bit machine. It has 32 bit internal data paths, and most instructions manipulate 32 bit data, so a single machine instruction can deal with a lot of information.

3. How much memory does Lisa have?

Lisa contains 1 megabyte of memory (1 megabyte = 1024K bytes = 1,048,576 bytes). The memory contains extra cells, called parity bits, to enhance reliability. Lisa was designed with an address space of 2 megabytes, so we'll have the option of doubling Lisa's capacity in the future.

4. Does Lisa have memory management?

Yes. Memory management is a hardware circuit that makes it easy for a computer to run many programs simultaneously. The programs don't run exactly at the same time, rather, the processor switches from one program to another so quickly that it appears that it is doing many things at once. Memory management allows a user to keep several documents on the screen at the same time, to work on one document while another is printing, and to generally mimic an office environment where individuals often do many things at once.

5. Is Lisa a multi-user system?

The Lisa Office System was designed to work the way people actually work. That is, instead of designing a system that allowed many people to do one thing, we designed a system that allows one person to do many things at once. However, third-party vendors are developing multi-user operating systems that will enable many people to use Lisa simultaneously.

6. What's so great about a bit-mapped display?

The bit-mapped display allows Lisa to show great graphics on the screen: it makes the sophisticated user interface possible and allows Lisa to display many typestyles on the screen at the same time. Without a bit-mapped display, Lisa would be constrained to the 80-column, text-only realm of traditional computers.

7. Why doesn't Lisa have a full-page display?

Lisa's high-resolution bit-mapped display conveniently shows a half page. Apple felt that a half page is a sufficient size because users can scroll to any portion of a document quickly. In addition, several applications allow 'split windows' whereby one can view several portions of a document simultaneously. A full-page display would be very expensive, and it would also increase the amount of space Lisa occupies on a desktop.

8. What is the screen resolution?

Lisa has a high resolution display that allows it to form sharp graphical and textual images. The screen is composed of over 262,000 dots orgranized as 720 columns of 364 lines each. There are 90 dots per inch horizontally and 60 dots per inch in the vertical direction.

9. Why did Apple go for a black on white display? Isn't amber or green on black better for your eyes?

The original research done in Europe on the ergonomics of CRT displays showed that what bothered people's eyes was the contrast between the black on white paper they were using and the white on black CRT display that most terminals had. To lessen the contrast, green or amber on black was chosen, but the research showed that black on white displays would be best, providing that the white on the CRT wasn't too bright. So we designed for this best condition: black on white on the CRT to match the black on white paper, which is easier on the eyes than green or amber.

10. Why doesn't Lisa have a color display?

A color display, of the same resolution as Lisa's black and white display, would be extremely expensive, adding over 30% to the retail price to retain the high performance.

11. Why did you choose the mouse as the key to the user interface, rather than function keys, touch-panel displays, or other devices?

Seeing and pointing is much faster than thinking and typing. The mouse allows one to point to a menu or icon to quickly control the system. Function keys, on the other hand, force the user back to the keyboard, to hunt and peck for the right key. Also, one always runs out of function keys, and programs often resort to shift key combinations, plastic keyboard overlays, or key definitions on the screen which confuse the user. Touch panel displays are better, but they're still difficult to use. One has to hold a hand up to the screen, which can be very fatiguing after a long day using the system. We think the mouse is the fastest, most comfortable, and easiest pointing device invented.

12. What kinds of mass storage does Lisa support?

Floppy disk. Lisa contains two built in floppy disk drives. The floppies are of an Apple proprietary design, the goals of which were high density and reliability. Each floppy disk can store over 860K bytes of information, more than 300 pages of text. Diskette loading and ejecting is controlled by the computer, so users can't accidentally destroy information by removing diskettes at the wrong time, as is the case with conventional disk drives.

Hard disk. Lisa systems use the Apple ProFile hard disk. The ProFile stores 5 megabytes of information, and it connects directly to Lisa's built-in parallel port. Additional ProFiles (up to 7 total) may be added by connecting them to optional Parallel Interface Boards.

13. How can Lisa connect to external devices?

Lisa supports the two standard types of device connections: serial and parallel.

Serial ports. Lisa contains two built in serial ports to connect to serial devices such as the Apple Daisy Wheel Printer or modems. The serial ports support both synchronous and asynchronous protocols at a variety of data rates, as well as full auto-dial/auto-answer capability

Parallel port. Lisa has one built in parallel port to connect to devices such as the Apple Dot Matrix Printer or the ProFile hard disk drive. There is also a Parallel Interface Board that can plug into one of three expansion slots. Each Parallel Interface Board contains two additional parallel ports, so systems with both a dot-matrix printer and a ProFile use a Parallel Interface Board.

14. Can I add additional boards to Lisa?

Lisa has three slots for peripheral expansion boards. These slots can support future peripheral devices. The Parallel Interface Board noted above can reside in one of these slots.

15. Does Lisa have a clock?

Yes. There is an Apple designed circuit inside the machine that keeps track of the day and date. The clock can also control the power supply (it runs off of a standby source, like an instant-on TV), turning on the system at a preset time. Future software packages may take advantage of this feature.

16. Is there any protection against power failures?

Lisa contains a battery circuit that keeps the clock and certain critical areas of memory 'on' for over 24 hours after a power failure. The system will go down, but the time of day and other critical information will remain intact. The Operating System uses a highly redundant file structure to protect against mishaps. Although some data may be affected, the Operating System can often reconstruct most of a disk damaged by power failures or even improper handling.

17. Describe the Lisa power supply.

The Lisa power supply is based on a 'switching circuit' design that is highly efficient. It was designed to operate over a wide range of voltages and line frequencies.

18. Can Lisa generate sound?

Lisa has a built in speaker and driver circuit that can be used to emit tones of different frequencies. In addition, the volume of the speaker can be programmed by software.

19. What kinds of peripherals are available for use with Lisa?

Currently, Lisa supports the Apple ProFile hard disk drive, the Apple Dot Matrix Printer, and the Apple Daisy Wheel Printer.

20. How easy is it to take a Lisa apart for service?

The system has been designed to be serviced without using a screwdriver. All components are modular so the system can be opened and any user serviceable module replaced in a matter of minutes.

21. What features to support ergonomics have been built into the machine?

Lisa's screen supports black letters on a white background to reduce eye fatigue by reducing contrast changes between the system and normal paper in the work environment. The keyboard is detachable so it can be placed in a comfortable position. The system has no fan and is quiet in an office. Lisa has a small footprint so it doesn't occupy a lot of room on a desktop. The mouse was designed to operate on any surface, even glass, so large mouse pads aren't necessary. The mouse was designed to be a comfortable, easy to use, efficient pointing device.

22. Did you consider voice?

Yes. We don't think the technology is advanced enough for a very useful voice interface, but we designed Lisa so that we could accommodate future advances in voice technology. Our Advanced Development Laboratory continues to investigate voice technology.

Software Questions and Answers

Organization

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  - LisaProject - Project Management
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  - LisaWrite - Word Processing
  - LisaGuide - Interactive Tutorial
  - The Calculator and The Clock
- Languages and Development
  - General
  - Languages
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What's Available

1. **What applications are available with Lisa?**

   LisaCalc, LisaList, LisaProject, LisaWrite, LisaGraph, LisaDraw, and LisaTerminal. In addition, a calculator and clock are provided. See General Questions #8.

2. **What languages and operating systems are available?**

   Pascal, BASIC-plus, and COBOL Level 2 are available, and other languages are under development. Lisa has an Apple-developed operating system, the Lisa O.S., and other operating systems will be available from Microsoft (Xenix, a version of Unix), and Digital Research (CP/M-68).

3. **What small business software will be available and when?**

   BPI, Inc., developer of accounting software for the Apple II and Apple III, is developing similar software for the Lisa. Contact your dealer or BPI directly for more information.

4. **Can I access remote data bases with Lisa?**

   With LisaTerminal, you can retrieve or send information to any database that can be accessed through asynch communications. For example, the Source, Dow Jones, Compuserve, etc. can all be accessed.

   Also, corporate data bases residing on IBM computers can be accessed through Lisa's 3270 emulation products, to be available later this year.

5. **Does Lisa have an electronic filing system?**

   Lisa's Desktop Manager is a powerful, effective electronic filing system. See the Desktop Manager section for more detail.

6. **Can you do mailing lists with Lisa?**

   LisaList, our personal database product, can quickly and easily manage large lists such as mailing lists. It does not, however, have the capability of printing out to mailing labels or envelopes at this time.

7. **Does Lisa have a calendar program?**

   Lisa has a clock that shows the time and date. Calendar scheduling can be done with the date and calendar capabilities of LisaCalc, or with the project scheduling features of LisaProject.

8. **Does Lisa have a tickler system?**

   Not at this time.

9. **Can I create and save forms?**

   You can create forms or templates with any of the applications by simply making your form into a "Stationery Pad." From then on, it will be saved like any other Lisa stationery. Conventional form creation, with fields that you tab between to enter data, is not available in LisaWrite, but this function can often be handled in LisaCalc.

Integration of the Applications

1. **What applications can I use together?**

   Any combination of Lisa "tools" can be used together, and all can be displayed on the Lisa screen at the same time.

2. **Between what applications can I cut and paste information?**

   Data can be moved from LisaCalc to LisaWrite for inclusion in reports or memos, and to LisaGraph for plotting. Charts and graphs can be moved from LisaGraph and LisaProject to LisaDraw for customization. In addition, data can be moved from LisaCalc or LisaWrite to LisaTerminal, and data from LisaTerminal can be moved to LisaWrite.

Competition

1. **How does Lisa compare to VisiON?**

   The following are the major differences:

   - User-interface: Lisa offers a better user-interface, employing graphics to simplify the system's operations; VisiON glues together existing VisiSeries applications, and the result reflects a lack of solid integration
   - Desktop Model: Lisa emlploys a very intuitive file system, with documents and folders. VisiON uses a conventional filing system.
   - Applications: Lisa applications are richer, more powerful, and more comprehensive.
   - Printing: Lisa offers unsurpassed printing. Period.

   Note the following:

   - VisiON is today just a demo, where Lisa was 2 years ago. Today, Lisa represents an investment of 200 man-years and $50 million.
   - VisiON will not necessarily be cheaper than Lisa: it will probably require an IBM with lots of memory, a hard disk, graphics boards and monitors, etc., and could well end up costing more than $10,000.

2. **How does Lisa compare with 1-2-3?**

   Ben Rosen's Newsletter described 1-2-3 as an evolutionary product - essentially a spreadsheet package like VisiCalc with enhancements. For spreadsheet-type applications, it is a very powerful tool, particularly for today's conventional computers. Lisa, however, is a revolutionary general-purpose office tool with a wide range of applications. There is no comparison between the two in the areas of ease of use, graphics, capacity, printing, communications, growth opportunities.

Learning Lisa Applications

1. **What is the best Lisa tool to start with?**

   Any. LisaGraph is quickest, but user should probably start with the program they will use the most.

2. **How much time will I need to feel comfortable with Lisa?**

   Our testing shows new users can learn to use the Lisa applications well enough to do useful work in about 1/2 hour. Mastering the applications, of course, depends on how frequently you use the Lisa, but it will be much faster than with conventional computers.

3. **You claim that you can learn Lisa applications in 1/2 hour? How do you know?**

   Apple has done extensive testing of both our software and our documentation. We've found that the mean time to completing the "Getting Started" tutorial for each application was less than 30 minutes. These studies included a short test at the end of the tutorial to make sure that each user had learned enough about the application to do work on their own. Apple does not, however, claim that every user can accomplish this in 30 minutes.

4. **What documentation is available with Lisa?**

   Each application comes with a brief tutorial called "Getting Started" which will teach you the basics of that application in about 1/2 hour. In addition, there is a complete example-driven tutorial and a complete reference guide. Finally, a handy reference card is supplied.

   The Lisa system comes with LisaGuide, an interactive tutorial that teaches the global basics of the Lisa user interface. There is a complete Owner's Guide, that includes installation, maintenance, and troubleshooting information.

Desktop Manager

1. **What is the Desktop Manager?**

   Lisa's Desktop Manager is a powerful, effective electronic filing system. It uses icons, or pictures, of documents and folders to mimic your own filing system, while providing tremendous power to organize and reorganize your files quickly and easily. Filing a document into a folder is as easy as pointing at the document with the mouse and moving into the folder, just as you now pick up your documents and place them in a folder.

2. **Why is this better than conventional filing systems?**

   First, because you don't have to learn or remember filing commands, syntax, file names, etc. Second, you point to a document to open it, close it, file it away, discard it, etc., rather than typing in a command -- i.e. you do it the way you currently do with real paper and folders. Third, it dramatically improves your efficiency. Using the mouse to point is much faster than typing commands and file names, and filing is one of the most common and frequent tasks in the office. Finally, it is easy to organize your documents exactly as you want - in folders, in folders within folders, etc.

3. **How many folders and documents can I have?**

   As many as you need. You are given a "pad" of empty folders, and you can "tear off" new folders from this pad whenever you want. Likewise, you have a "stationery pad" from which you create new documents of any type at any time.

4. **What administrative information does the Desktop Manager provide?**

   Name of document, date created, date last modified, and size.

5. **How do I protect classified information?**

   The safest means is to store classified material on Lisa diskettes, and then lock the diskettes away.

Spreadsheet/LisaCalc

1. **What significant competitive advantages does LC have over popular spreadsheet programs such as VisiCalc, SuperCalc, and Multiplan?**

   - larger capacity (255x255 vs. conventional 256x64)
   - radically easier to use (menus vs. cryptic commands, mouse to move around quickly, screen = printed copy)
   - printing (can get 132 columns on conventional 8.5x11 inch paper using 15 pitch and horizontal printing format)
   - integration with graphics and word processor
   - special features for scheduling and financial analysis (15 digit precision, NPV, annuity, compound function, dates, durations, built-in calendar)
   - more powerful formula-generation capabilities (e.g. you can make a multiplication table in one simple formula, vs. multi-formulas in VisiCalc)
   - other special features: protection, display and print all formulas, circle missing values to aid in data entry, multiple typestyles, manual and/or automatic page breaks, variable column widths, replication of any rectangular range (vs. std replication of only 1-dimensional ranges), splitting the window into multiple views, more flexibility in formatting (e.g. display currencies).

2. **Why isn't graphics integrated into LisaCalc directly?**

   Moving data from LisaCalc to LisaGraph is fast due to Lisa's large memory and powerful CPU, and is easy due to Lisa's revolutionary user interface. For example, moving information from VisiCalc to VisiPlot typically takes 5 minutes and 25 steps -- with Lisa, it takes about 4 steps and as little as 15 seconds.

3. **Can you consolidate models?**

   LisaCalc supports very large models on one spreadsheet -- up to 255 rows by 255 columns -- so that many problems that require multiple spreadsheets on conventional personal computers can be brought together in one LisaCalc document. You can also have more than one model showing on the screen at one time and then copy & paste information between them if desired.

4. **Is LisaCalc compatible with VisiCalc on the II or the III ?**

   LisaCalc and VisiCalc share much of the same functions and formulas. This means that it will be easy to port your Apple II or Apple III VisiCalc models over to LisaCalc. There is not, however, any mechanism for doing this automatically. We expect third-party developers to provide an automatic mechanism for tranferring VisiCalc models to Lisa.

5. **How fast is LisaCalc?**

   For small models the speed of LisaCalc is similar to the speed of VisiCalc. For large models, LisaCalc is faster than other spreadsheet programs. LisaCalc performs calculations using the IEEE floating point standard, which gives it accuracy unmatched by other spreadsheet programs.

6. **What functions are available?**

   Average, count, max, min, sum, sum of squares, absolute value, square root, natural log, base 10 log, exponentiation, sin, cos, tan, asin, acos, atan, integer, round, present value of an annuity, compound interest, NPV, IF-THEN-ELSE, lookup, search.

7. **Do I have to use the mouse to move around?**

   No. You can use the arrow keys on the numeric keypad (old keyboards don't have the correct keycaps, but the keys work).

8. **Do I have to type in the coordinates of a cell when building a formula?**

   No. You can point to the cell with the mouse, hold the option key, and press the mouse button. The coordinates of that cell will automatically be entered in the formula.

9. **How do you compare 2 years figures in LisaCalc?**

   This is very simple. If the figures are in the same document, you can use LisaCalc's "split-window" feature to see view two parts of the model at once. If the figures are in two seperate documents, you can easily display both documents on the screen at the same time.

Database/LisaList

1. **Does Lisa have a database program?**

   Yes, LisaList. Its capacity is 4000 records, or about 4 megabytes, which is much greater than database programs available on conventional personal computers. You can sort on any fields (ascending or descending), and search on any fields (various types of comparisons are available such as >,<,= etc.).

2. **How does LisaList compare to other database programs?**

   - LisaList is more flexible in revising, searching, sorting, and displaying information
   - LisaList has more capacity, so you won't run out of room for your data
   - LisaList has built-in protection mechanisms for you data (e.g. data recovery mechanism in case of a crash; data entry checks; undo and restore to last saved version commands)
   - powerful editing capabilities (including adding or deleting columns)

3. **How large a list can I have?**

   LisaList's capacity far outstrips that of other end-user database products on conventional personal computers. The list can be up to the size of a disk (about 4 megabytes), though you can only back up a list to floppy diskettes if it is smaller than 600,000 characters. This would be, for example, a list of 6000 rows with 100 characters each, or 10000 rows of 60 characters each. The maximum number of columns is 100.

4. **Can I do column or row arithmatic in ListManager?**

   Activities that are mathematically intensive can use the powerful calculation capabilities of LisaCalc, or Lisa's built-in multi-function calculator. LisaList is more suited to the thousands of applications that do not require calculations. We are, however, investigating incorporating such capabilities in a future release of LisaList.

5. **What type of reports can I do in LisaList?**

   You can print out many different lists by making columns visible or invisible, and by specifying which rows should be displayed via the powerful search capabilities.

6. **Can I sort on numeric and alphanumeric fields?**

   Yes. In addition, you can sort on dates, times, phone numbers, social security numbers, currencies, and zip codes.

7. **What kind of sort limitations are there?**

   None - you can sort on every field by specifying primary sort filed, secondary one, etc.

8. **Can I merge files?**

   LisaList is a single-file system. However, its large capacity, plus the ability to generate sublists (see #5), reduces the need to keep different files.

9. **Is LisaList a relational data base? Does it support indexing?**

   Yes and Yes. The index is built on the first field (its a B-Star index type), but sorting and searching can be done on any field.

Project Management/LisaProject

1. **How does LisaProject compare with other scheduling programs?**

   There are none like it. LisaProject is much easier to use due to its graphics interface and the tremendous flexibility in editing any part of the schedule. Its large capacity is also unparalleled for microcomputers. Unique features include:

   - ability to specify specific individuals to work on tasks
   - zoom function to see the entire project at once
   - manual override for task and milestone dates
   - multiple start and end nodes for very complex projects
   - easy to print out large projects (up to 12 page x 5 page)
   - quality printed output suitable for presentations and reports
   - integration with LisaDraw to customize charts as required

2. **Is any prior knowledge of project scheduling techniques, such as PERT (Project Evaluation and Review Technique) required to use LisaProject?**

   No. While LisaProject is based on PERT, anyone that has every managed a project or a schedule with paper and pencil can use LisaProject.

3. **How large a project can I schedule?**

   The schedule chart can be as large as 32 square feet, and the resource and task charts have unlimited size.

4. **Does LisaProject take resource constraints into account?**

   Yes, it does. For example, it will not allow a resource, such as a person, to be used on the different tasks at the same time. Contraints on resources such as materials, however, are not available.

5. **Can I merge different project schedules?**

   No, but LisaProject's large capacity and the ability to set dates for any task or milestone make having different schedules unnecessary. For example, if Project A and Project B are independent except that B requires task 10 of A to be finished before starting its task 20, then the user can model this two ways: put A and B in the same document with separate start and end milestones, and tie task 10-A and task 20-B together. Or, have two separate documents, put in a milestone in project B that says "Task A-10 Finished," and set its completion date to the calculated completion date of Task 10 from Project A's schedule.

6. **Can I input information about resource costs?**

   LisaProject does not associate any costs with the schedule.

7. Does LisaProject figure out the optimum schedule?

   Yes, if the same resources are not used in parallel tasks. Otherwise, the schedule may not be optimum.

Business Graphics/LisaGraph

1. **How does LisaGraph compare with the competition?**

   - LisaGraph is much easier to use, particularly because the data and the graph are seen together
   - LisaGraph plots data instantly - there is no waiting
   - plotting data from your spreadsheet models is faster and easier than competitive products
   - integration with LisaDraw allows for total graphics customization
   - printing quality surpasses other graphics packages
   - the wide selection of typestyles for titles and annotations is unsurpassed

2. **Can I do statistical analysis or curve fitting in LisaGraph?**

   No, but the user can easily use LisaCalc or the Calculator for some statistical analysis.

3. **When I copy from LisaCalc to LisaGraph, do the formulas go along?**

   No, only the values. If you need to recalculate and replot your data, you should go back to LisaCalc, recalculate, and then copy the new data into LisaGraph. This is a very fast and easy technique (about 4 steps and as little as 15 seconds).

4. **Is a graph drawn from a LisaCalc model automatically updated when the LisaCalc model is changed?**

   No, the new values must be recopied to LisaGraph. See #58.

5. **How do I mix line and bar graphs?**

   Choose "Bar" from the Graph menu. Select the column(s) of data that you want to be show with a line. Choose "Show as Line" from Customize menu.

6. **Can I transpose data, or plot it as rows rather than columns?**

   Yes. Select the columns of data. Cut. Select Row A. Paste. The data will be transposed from a column orientation to row orientation automatically.

7. **Are more types of standard graphs, such as stacked bar charts, planned in the future?**

   An obvious extenstion of LisaGraph would be to add more graph types.

LisaWrite

1. **How does LisaWrite compare with other word processors?**

Very favorably. Major advantages include:

- Much easier to use in creating and editing text - just point with the mouse to where you want to insert new text or to text you want to change
- Much easier to format you text - there are no formatting codes to remember, and LisaWrite's "What you see is what you get" fidelity means that all formatting is done on the screen, so you don't have to guess at what your final paper is going to look like.
- Printing flexibility and quality is unsurpassed, and it is the final output, after all, that people will see. Examples of flexibility: combine multiple typestyles -- including proportional spaced fonts, large presentation sizes, small 15 pitch sizes, as well as standard Courier and Elite, and add bolding, italics, and underlining; print horizontally or vertically (i.e. portrait and landscape); use special characters such bullets, accented letters for foreign names or terms, technical symbols, etc; print bold, italics and regular typestyles on the Apple Daisy Wheel printer without changing printwheels; print 10 pitch, 12 pitch, or proportional spaced text without changing printwheels; and more! The quality of output from Apple's Dot Matrix Printer is unsurpassed for a low-cost printer, and provides correspondence quality text as well as graphics.
- Tremendous formatting flexibility (e.g. 4 types of tabs, 4 kinds of line spacing, 11 typestyles plus bold, italic, underline, superscript, subscript).

2. **Can I move text from an Apple II or ///, or other word processors, to LisaWrite?**

   The user can copy information from LisaWrite to LisaTerminal and vice versa. Thus, any word processor that can send ASCII text asynchonously, as Apple Writer /// can via Access ///, can transfer text to and from LisaWrite. Some formatting information, such as tab stops, may have to be re-entered.

3. **Can I cut graphics into LisaWrite?**

   No, but graphics and text can be combined in LisaDraw when the user does not need the powerful formatting capabilities of LisaWrite.

4. **Does Lisa have a spelling checker?**

   Not at this time, but this is an area that Apple is currently pursuing.

5. **How does Lisa store and retrieve repetitive phrases (i.e. a glossary)?**

   The Lisa user can easily store such phrases in a standard LisaWrite document, and then copy/paste to the receiving document. This is easy because you can display the phrase document side by side with the document you are working on, so that you don't have to remember any special keywords or function keys.

6. **How do I do footnotes?.**

LisaWrite does not provide any automatic means for placing footnotes at the bottom of the page.

7. **Does Lisa provide technical typing?**

   There is no special program or "mode" for technical or statistical typing. LisaWrite does, however, provide superscripts and subscripts. In addition, Lisa applications can display and print the following technical characters:

   ∞, ±, •, °, ∑, †, π, µ, «, », ß, ∂, ƒ, ∆, ¬, Ω, ≈, √, ∫, ≤, ≥

   These, plus superscripts and subscripts, can serve many technical typing requirements.

8. **Can I have dual columns in LisaWrite?**

   LisaWrite only supports single-column format.

LisaDraw

1. **What would I use LisaDraw for?**

   LisaDraw is an amazingly versatile product.

   - draw organizational charts and keep them up to date with little effort
   - create flow charts and diagrams for presentations
   - add dramatic impact to business charts and graphs
   - illustrate interdependencies between jobs and projects
   - draw schematic diagrams
   - illustrate important geographic information with maps
   - draw floorplans or office diagrams
   - create simple illustrations to describe complex situations

Interactive Tutorial/LisaGuide

1. **What is LisaGuide?**

   LisaGuide is an interactive training guide that teaches you how to use Lisa. It takes you through a number of examples and graphically instructs you on the basic concepts of using Lisa.

2. **When do I use LisaGuide?**

   When you first get your system, the first thing you should do is use LisaGuide.

The Calculator and The Clock

1. **What is the Calculator?**

   Lisa supplies a calculator for doing simple arithmetic using +, -, *, /, square root, percentages, and recipricals. It also has 1 memory register. The Calculator offers 3 kinds of notation: standard 4-function, adding machine, and Reverse Polish (as used in HP calculators).

2. **What is the clock?**

   Lisa has a built-in clock to keep time of day and the date. The user may change the time and date by simply selecting those figures and typing over them.

Support, Service, and Training

1. **What kind of guarantee does Lisa have?**

   Apple's standard 90-day warranty for parts and labor applies.

2. **Can I buy a maintenance agreement?**

   Maintenance contracts for on-site service with 4 hour response times are available from RCA and from some dealers. All Lisa dealers offer carry-in service for your Lisa.

3. **What kind of training programs are available?**

   Apple has developed a variety of training programs for Lisa. Contact your dealer or national account executive for more information.

4. **What if I have a problem setting up my Lisa?**

   Free installation of the system is included with the Lisa Office System. Either your dealer or RCA will install the system and verify that it works.

5. **What is the upgrade policy for software and hardware?**

   For hardware, there is the standard Apple 90-day warranty against defects in parts and workmanship. An extended warranty, AppleCare, is available at extra cost. The first software update will be available to customers free of charge. Thereafter, customers will pay for updates (no prices determined at this time).

Development Software

1. **Will Lisa be an open system?**

   Yes, very much so. We intend to have a very aggressive and supportive program at Apple to suport independent software developers for Lisa. We believe that Lisa represents a strategic and creative opportunity for independent software developers, unlike any other since Apple invented the personal computer, and we intend to do everything possible to let you take advantage of this opportunity.

2. **How do I get a machine and when?**

   Lisa will be available to independent software developers at first shipment (Spring, 1983). Developers will be given highest priority. Apple will send you more information.

3. **What languages are available?**

   Pascal, BASIC-Plus, and COBOL will be available at first release. Other languages are under development. Pascal generates 68000 code and is Lisa's preferred development environment. BASIC-Plus is very similar to DEC's BASIC, and COBOL is Level 2.

4. **What operating systems are available?**

   We have our own operating system for Lisa (single-use, multi-tasking). Microsoft will offer Xenix, a version of UNIX, and Digital Research will offer CP/M-68.

Independent Software Developers

1. What types of support will you have for Independent Software Developers (ISDs)?

AT FIRST SHIPMENT WE WILL BE PROVIDING AS MUCH OR MORE DEVELOPMENT SUPPORT AS ANYONE ELSE IN THE INDUSTRY DOES TODAY. LISA WILL BE AN OPEN SYSTEM. We will provide at first shipment:

- -Pascal which will produce native 68000 code
- -COBOL Level 2
- -BASIC-Plus, a BASIC very similar to DEC'S BASIC
- -An editor, plus about 20 utilities

We expect several other languages to also be available at first shipment or soon thereafter and will encourage others to be implementing other languages.

2. What operating systems will be available?

We have our own operating system for Lisa, plus Microsoft will offer Xenix (a version of UNIX) and Digital Research will offer CP/M-68.

3. How will all this work in the Lisa integrated office applications?

The integrated system runs in its own environment. For now, users will switch between the integrated office environment and a traditional development environment we call the Workshop. However, we have made it easy to switch back and forth.

4. How can I write software to integrate into the office environment?

We are working on a system called the Developer's Toolkit which will be released by the end of the year. The Lisa office environment is very sophisticated and has taken us years develop. The office environment relies heavily on shared files and shared code. We are repackaging our own tools into the Toolkit so that independent developers will not have to invest years writing for Lisa.

5. So what can I do before the Toolkit?

First, you can easily move existing applications from other hardware like Apple II, ///, IBM PC, etc., to Lisa to run under our operating system, XENIX, or CP/M. So for now, users who buy a Lisa will run your application outside the integrated office environment in a mode just like they have on any other computer, but in a manner which is simple and straightforward.

Second, you can begin preparing for the release of the Toolkit by learning Pascal. The Toolkit will support Pascal because all our Lisa applications are written in Pascal.

6. How do I get a machine and when?

Lisas will be available to independents software developers at first shipment (Spring 1983). Developers will be given highest priority. ISDs can place their orders with authorized LISA dealers. We will soon be publishing a more detailed description of our program to support ISDs and would like to send you more technical information at that time, sometime in the next few weeks (by Feb. 25).

Lisa

NETWORK INTRODUCTION PACKAGE

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Ethernet Announcement

Etherbox Specification 11
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apple computer

AppleNet Announcement

AppleNet Press Release

Cupertino, California, January 19, 1983—Apple Computer, Inc. has developed a local area network that will allow companies to link together electronically their Apple personal computers to exchange information and share centrally-stored files.

The network, known as AppleNet, speeds and enhances office communications by allowing Apple computer users to electronically transfer information from one system to another quickly and easily. Designed especially to complement Apple personal computers, AppleNet combines reliability and simplicity in design, and is easier to install than a home stereo.

AppleNet links together as few as two systems or can be expanded to meet the needs of a larger office. All Apple computers — Lisa, Apple ///, and Apple // — use AppleNet. Thus, an organization can connect all of its Apples to a single network. At under $500 per connection, AppleNet is a cost-effective solution for both large and small organizations.

"Apple recognizes that network communication is an integral part of the personal computer industry. As a result, we are firmly commited to providing this capability for all Apple users," said A.C. "Mike" Markkula, Jr., President and Chief Executive Officer.

AppleNet uses the published and widely-accepted Xerox Network Systems (XNS) Protocols. Apple will encourage the development of network-related products by making public all network interfaces and specifications. All Apple software will be developed to function on both AppleNet and the Xerox/DEC/Intel Ethernet standard network.

Network Capabilities

Local area networks enable computers in the same office to communicate with one another via electronic messages sent along a cable. Through AppleNet, users can gain access to information contained in common files and databases, distribute documents electronically, share peripherals such as expensive mass storage devices and printers, and communicate with other computers and remote data bases.

Using a drop cable, systems are connected to the network through an interface device called a cluster box—a passive unit containing no electronic components. Each box supports the connection of up to four computers to the network cable. For offices starting with two to four computers, only a cluster box is required. For larger networks, cluster boxes are connected to a twinax network cable—a standard, two conductor cable shielded for noise immunity.

Each 2,000 feet of twinax cable can support up to 32 cluster boxes—a total of 128 systems. A simple "gateway" computer expands AppleNet past 2,000 feet. AppleNet provides flexibility in the physical office arrangement by allowing drop cables connecting computers to the network to be extended up to 100 feet from the cluster box.

AppleNet's Baseband Bus Architecture uses Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to avoid data loss during communication. The twinax cable carries information at one milion bits per second.

All network electronics are located on an interface card that plugs into the computer. This modular design increases network reliability, and, should a network failure occur, promotes swift isolation of the problem.

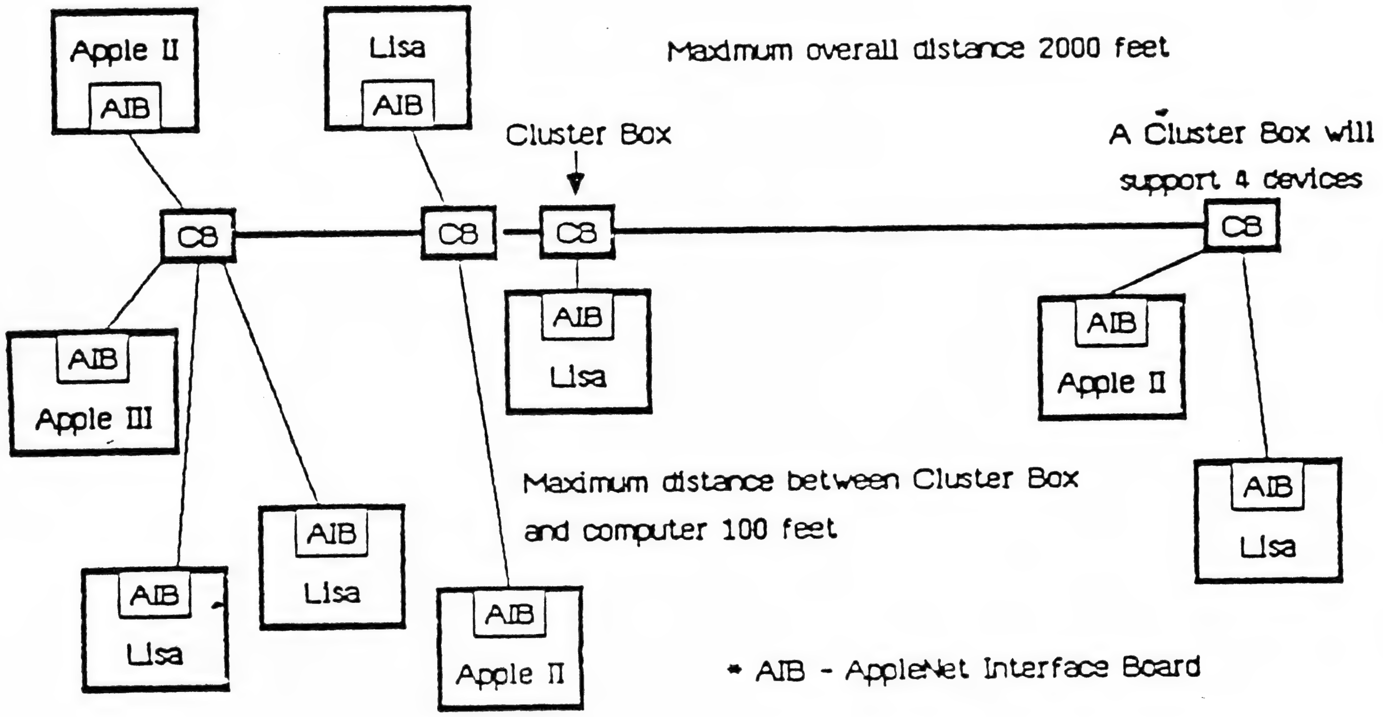
Availability

AppleNet will be available in late 1983 through Apple's National Accounts program and authorized Apple dealers.

AppleNet Specifications

- Baseband CSMA/CD (Carier-Sense Multiple-Access Collision Detection) Bus Topology.
- 1 Million bits per second Bandwidth.
- Maximum length of the Network Cable 2000 feet.
- Maximum length of the Drop Cable 100 feet.
- Network Cable Twinax.
- Maximum number of devices 128 per 2000 foot network.
- Passive network cable connection - Cluster Box.

AppleNet Architecture Diagram


Apple II
AIB
Lisa
AIB
Maximum overall distance 2000 feet
Cluster Box
A Cluster Box will support 4 devices
CB
CB
CB
CB
AIB
Lisa
AIB
Apple II
AIB
Apple III
Maximum distance between Cluster Box and computer 100 feet
AIB
Lisa
AIB
Lisa
AIB
Lisa
AIB
Apple II
* AIB - AppleNet Interface Board

Bus Topology

The primary advantages of the bus structure is the ability to implement distributed control of the bus. This results in a reliable topology in which the failure of any node disrupts service at that node only, while the rest of the network can continue to function.

The performance of bus topologies is dependent on the number of nodes connected, bus bandwidth, user traffic rates, protocols, and other timing related factors. Contention control schemes in which each node competes for access to the bus may provide bus utilization of 95% (or greater) of the available bandwidth.

Access Method

The contention scheme for controlling the distributed access of users to the AppleNet bus is Carrier-Sense Multiple-Access with Collision Detection (CSMA/CD). This is a decentralized control strategy in which each node wishing to access the bus listens to verify the transmission path is not being used before transmitting. Each node also listens while transmitting to detect a collision. If a collision occurs both sending nodes wait a different time interval (random) and try again. CSMA/CD was chosen because it is the most efficient access method available, is simple to implement, and is an access standard specified by IEEE 802 Local Area Networks Standards Committee. CSMA/CD also provides fair sharing of the network among nodes and remains stable under extreme network loads.

Bandwidth

Bandwidth is the width of the signal spectrum and is a convenient measure of transmission speed. Speed is an important property of any network in that efficient network utilization requires minimizing transmission time. The bandwidth of AppleNet was chosen as 1 million bits per second. This speed was chosen as appropriate for the cost/performance objective of AppleNet and more than adequate for the maximum number of nodes that AppleNet supports (128).

Extensive measurements have been performed on an 3 million bits per second operational Ethernet which supported 120 devices. These devices included personal computers, network servers, time-share computers, and gateways to other networks. Users of these devices use the network regularly for file transfer, electronic mail, bootstrap loading, software distribution, and many other purposes. In a typical 24-hour period, 2.2 million packets are carried in this network, totaling approximately 300 million bytes. For a 3.2 million bits per second channel, this amounts to less than 1 percent utilization of the available bandwidth. But utilization has high variance, and observed utilization has been as high as 3.6% for one hour, 17% for one minute, and 37% for one second. On the average, less than 1% of all packets are delayed due to deference, and less than 0.03% are involved in collisions. This existing Ethernet system could support a substantial increase in traffic without a noticeable increase in latency (message delay). This Ethernet was also tested under overload conditions and remained stable.

Because the number of nodes on a typical segment of AppleNet will be 40 to 60 rather than 120, a bandwidth of 1 million bits per second has proven to be effective and is expected to handle all levels of network activity.

Maximum Length of the Network

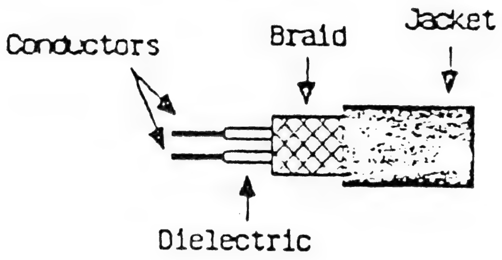
The maximum length of a single AppleNet is 2000 feet. This length is dictated by several factors, including the signal isolation of the cable used and the load imposed by cluster boxes on the cable.

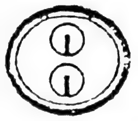
Surveys showed that this length would satisfy most departmental level requirements. Gateways will be used to connect AppleNets that require greater geographical coverage.

Network Cable

The network cable chosen for AppleNet is twinax cable. Twinax cable is a two-conductor, twisted, balanced wire having a specific impedance with a shielding braid around both wires. Twisting the two balanced signal carrying wires provides cancellation of any random induced noise voltage pickup, thereby protecting against low-frequency noise fields that pass through the copper braid. Twinax also provides protection against ground loops and capacitive fields.

Twinax Cable Diagram





Twinax cable was chosen because of its low loss characteristics in the 1 MHz signal range over a maximum distance of 2000 feet. The characteristic impedance of the cable (100 ohms) is well controlled in order to prevent reflections and for proper operation of the cluster boxes. The trunk cable is commercially available, and will be sold in preassembled lengths with connectors. The cable will be available in both PVC and Teflon versions. The Teflon cables may be required in certain installations to meet fire code.

Drop Cable

The maximum Drop cable length is 100 feet. This is the maximum distance that a device may be from a Cluster Box.

The drop cables chosen for the network are two shielded twisted pair cables. The primary requirement for two different cables is to reduce magnetic crosstalk and optimize impedance matching. The drop cables will also come in preassembled lengths. Both PVC and Teflon versions will be available.

Maximum Number of Nodes

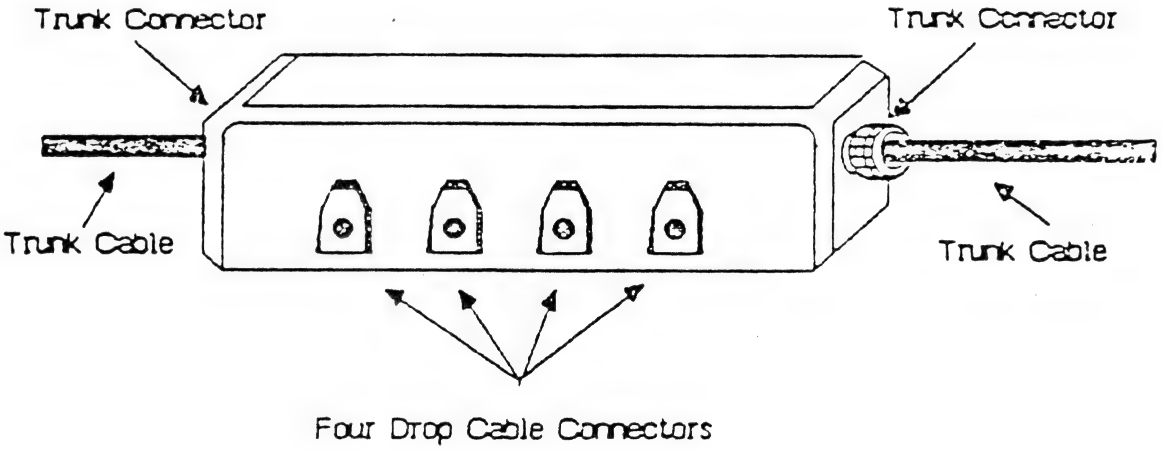
The maximum number of nodes that can be attached to a single AppleNet segment is 128. This maximum node number is based on the maximum allowable signal drop which is reached when 32 (4-port) cluster boxes are attached in a 2000 foot network segment.

Cluster Box

The connection of devices to the network are made through a Cluster Box. The cluster box can service up to four drop cables of 100 feet each that are connected through an interface card to an Apple //, Apple ///, or Lisa.

The cluster box allows the simultaneous transmission and reception of signals on the network trunk cable to support the Carrier-Sense Multiple-Access with Collision/Detection protocol. The cluster box is designed to provide good signal isolation between the transmit and receive signals. The cluster boxes are completely passive devices that use four transformer couplings. The transformer couplings provide good ground loop isolation.

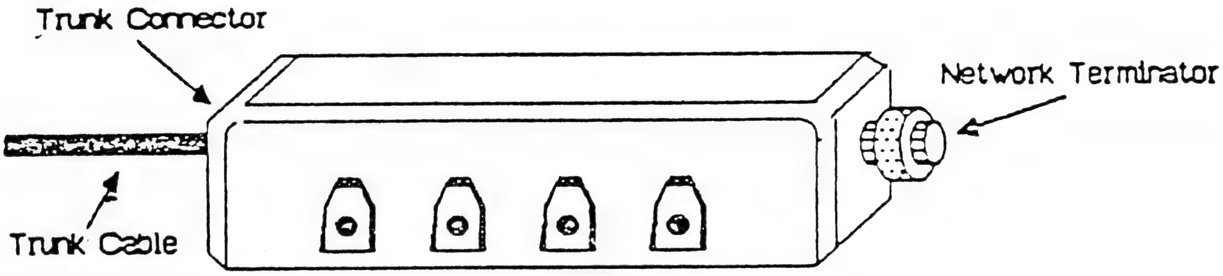
Cluster Box Diagram



Network Terminator

The network cable must be terminated at both ends with terminators that provide the characteristic impedance of the network cable. The terminator will connect to the end of a network cable segment with a barrel connector or directly to a cluster box. The terminator is pictured below.

Terminator Diagram

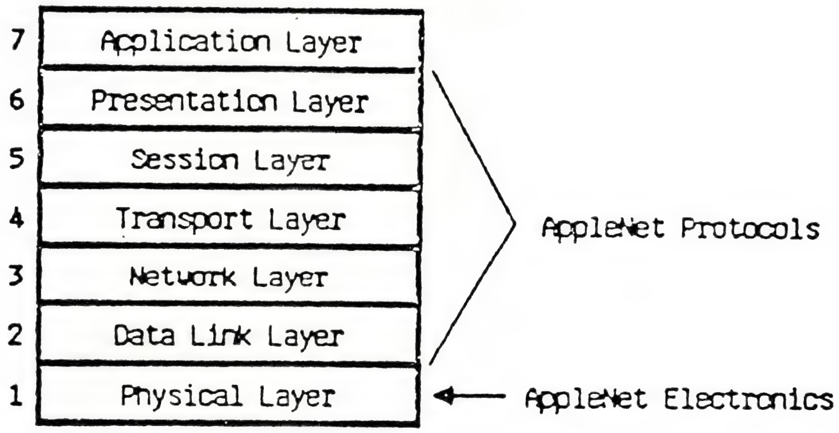


Protocols

AppleNet provides a set of layered protocols to define the communication between devices on the network. A layered protocol structure is used to allocate and isolate communication functions. Each protocol layer builds on and communicates through the services provided by the layer directly below it. The protocol layer in a sending device communicates with the peer protocol layer on the receiving device by passing its information down through the protocol layers under it to the media. The media then carries the information to the receiving node where it is passed up through the same protocol layers on the receiving side until it reaches the same protocol layer.

The advantage of layering protocols is, that if properly implemented, one protocol layer can be modified or replaced without impacting the overall protocol structure.

Protocols Diagram



The International Standards Organization (ISO) has defined a Reference Model for Open Systems Interconnection which is widely accepted as the architecture for intersystem communications. The Reference Model describes seven distinct protocol layers. These layers are from bottom to top: the Physical layer, which in AppleNet is the baseband; the Data Link layer which is CSMA/CD; the Network layer which is Xerox's Level 1; the Transport layer which is Xerox's Level 2; the Session layer; the presentation layer; and the Application layer.

AppleNet uses packet-oriented protocols; that is , all information (be it a short message or a large file) is transmitted in separate packets at the Data Link level. Each packet includes a "header" which describes the packet length, the destination address, and the source address. Packets may range in size from 32 bytes (minimum) to 4080 bytes (maximum on Lisa, 2048 bytes is the maximum on Apple // or Apple ///). It is anticipated that most protocols will use packets smaller than 600 bytes.

With the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) there is no global bus "arbiter" of the net when several nodes wish to gain access to the network. Instead, each node listens to the line, that is senses carrier, before placing its data on the line. Each transmitter waits a minimum time of line idle (Inter-Packet Gap) before attempting transmission.

However, it is possible (but not likely) that several nodes will sense the line as available at the same time and, thus, all attempt to transmit their packets; such a state is called a collision. When a collision is detected by transmitting parties, they enter a resolution mechanism which will guarantee that one of them will gain access to the line; the others will wait their turn and try again later. The particular method waiting procedure implemented in AppleNet is "exponential binary backoff." This means that colliders wait a time whose maximum value increases in an exponential manner. This is the same proven method used by Xerox's Ethernet.

The AppleNet Network layer is compatible with Xerox's Internetwork Datagram Protocol (IDP). This protocol decides where data is to go and is concerned with how to address a source and destination. IDP defines the internet packet and the rules for delivering it as a datagram. An internet packet is the fundamental unit of information that is passed between networks as a datagram. A datagram is an independent self-contained message. The internet gives its "best effort" to deliver internet packets, but does guarantee delivery. An internet packet consists of header and data. The internet packet header contains: a 16-bit checksum; the interpacket length in bytes, including checksum; a transport control field that maintains internetwork routing information such as hop count and maximum packet lifetime; packet type to identify the format of the data field of the internet packet; 32-bit destination and source network numbers, 48-bit destination and source host numbers; 16-bit destination and source socket number; and 0 to 546 bytes of data.

Internet packets are passed between sockets within the internet, much as the post office transfers letters between post office boxes. Communicating sockets may be on the same host, on different hosts on the same network, or on different hosts on different networks of the internet. A socket is simply a sub-address within a host, much as a P.O. Box is a sub-address in a postal station. The network address scheme allows for the broadcasting of packets to be received by all hosts on the network, multicasts to a group of hosts on the network, or packets transmitted to a unique host.

AppleNet also implements the Xerox's Level 2 Transport Control protocols. These protocols are needed to give structure to a stream of related packets. This may involve retransmission, sequencing, duplicate suppression, and flow control. The Transport Protocol implemented is the Sequenced Packet Protocol.

AppleNet Interface Board

All the electronics required to interface a system to AppleNet are located on theAppleNet Interface Board. This modular design increases network reliability, and should a network failure occur, promotes swift isolation of the problem. There is a different interface board available for the Apple //, Apple ///, and Lisa, which plugs into a standard expansion slot.

The AppleNet Interface Board uses a Z-8 processor with 2K bytes of ROM to store the Data Link Protocols. Up to 4K bytes of shared RAM is available for buffering of receive and transmit packets. The AppleNet transceiver is also located on this board.

All network communications are controlled by this interface board. This isolates the Apple computer from being constantly interrupted by network activity; only packets addressed to the specific Apple computer are passed to it.

AppleNet Marketing Questions

Q - Who will market AppleNet ?

A - AppleNet will be marketed by both Apple National Account Execs and authorized Apple Dealers.

Q - Who will install AppleNet ?

A - AppleNet will be installed by Apple Dealers, RCA Service, and Customers.

Q - When will AppleNet be available ?

A - AppleNet will be introduced (demonstrated) late summer 1983, and will be available to end users in late 1983.

Q - What Apple products will be supported on AppleNet ?

A - Apple //, Apple ///, Lisa, as well as all future Apple products.

Q - When will the Protocols be published ?

A - When we introduce AppleNet in the summer, the protocols which are available at that time will be published.

Q - What will be the arrangement for developers to get access to the protocols ?

A - There will be a minimal licensing fee.

Q - What services (such as File Server, Print Server, Communication Server) will be provided on AppleNet ?

A - It is Apple's intention to eventually provide all the servers which will be required to support our market.

Q - When will there be servers (such as File Server, Print Server, Communication Server) available on AppleNet.

A - It is Apple's intention to introduce these servers in a phased approach as they are ready.

Q - How does School-Bus relate to AppleNet ?

A - School-Bus is only for the class room environment and does not interface to AppleNet.

Q - What operating systems will be supported on AppleNet ?

A - It is currently under investigation.

Q - Will a File Server be required in order to transfer files between systems on AppleNet ?

A - No.

Q - If one of the networked systems fail does the whole network fail ?

A - No, just that one system.

Q - Is there a minimum AppleNet configuration ?

A - Yes, one cluster box with terminators, two drop cables, two AppleNet interface cards, and two systems.

Q - When will the AppleNet gateway be available ?

A - The gateway will be available sometime in 1984.

Q - Is Lisa required on an AppleNet ?

A - No.

AppleNet Compatibility Questions

Q - Will AppleNet be compatible with Corvus Omninet ?

A - No.

Q - Will AppleNet be compatible with Nestar Cluster/One or Plan -4000 ?

A - No.

Q - Will AppleNet be compatible with Ethernet ?

A - AppleNet hardware is not compatible with Ethernet.

AppleNet protocols are compatible with Xerox Network Systems (XNS) Protocols.

Q - Can files created on an Apple // or Apple /// be transferred to Lisa.

A - It is Apple's intention to provide the capability to transfer "text" files across all its product lines.

Q - Will Apple develop an interface to IBM Token-Passing nets ?

A - Yes if it becomes a widely used network.

AppleNet Technical Questions

Q - What is the maximum length for the Network cable ?
A - 2000 feet.

Q - What is the maximum length of the drop cable ?
A - 100 feet.

Q - How many Cluster Boxes can be connected ?
A - Up to 32 Cluster Boxes can be connected per 2000 feet of Network cable.

Q - Is there a minimum distance between Cluster Boxes ?
A - No.

Q - Is there a maximum distance between Cluster Boxes ?
A - Yes, 2000 feet.

Q - How many devices can be attached to one Cluster Box ?
A - Up to 4 devices.

Q - How many devices can be attached to AppleNet ?
A - 128 devices.

Q - Can you attach different systems (i.e. Apple //, Apple ///, Lisa) to one Cluster Box ?
A - Yes.

Q - Are the Cluster Boxes active or passive ?
A - The Cluster Box is totally passive (no electronics).

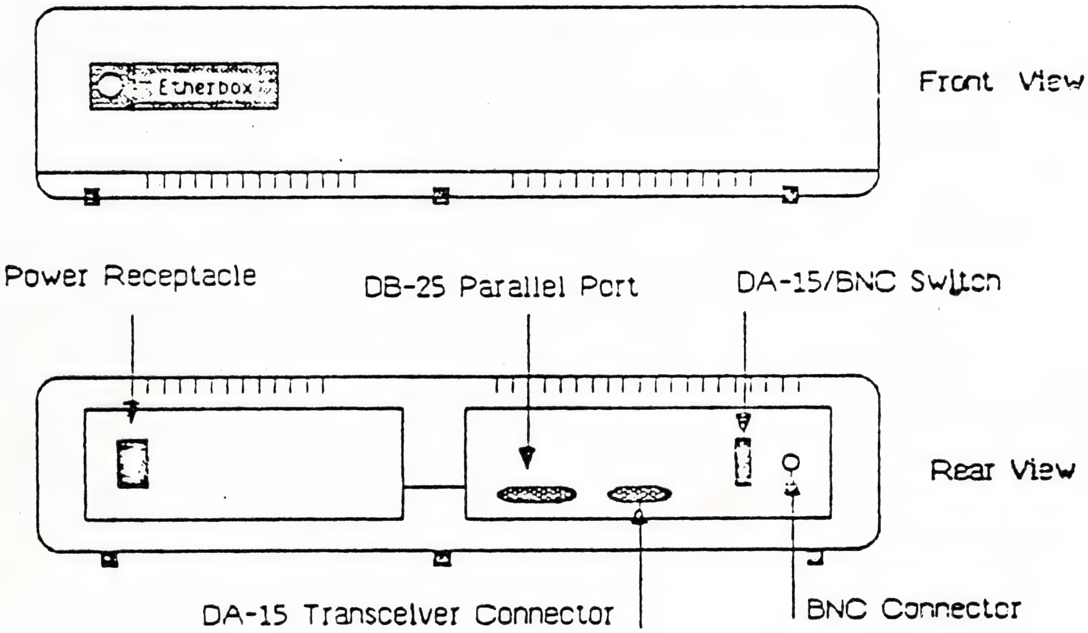
Q - Can all of the devices that connect to a Cluster Box function concurrently ?
A - Yes.

Q - Does AppleNet require terminators ?
A - Yes, a terminator is required at both ends of the network cable.

Etherbox Specification

Etherbox is a standalone self powered peripheral for connecting Apple //, or Apple ///, or Lisa to an Ethernet network. The Etherbox communicates over Ethernet at the standard Ethernet signaling rate of 10 million bits per second using the standard Xerox Data Link Protocols for transmission on the cable. The Etherbox is fully compatible with the Xerox/DEC/Intel Ethernet standard.

Etherbox Diagram



Connections

The interface between Apple products and the Etherbox are made through an Apple standard parallel port. Apple ///s, and Lisas come standard with a, bidirectional eigth-bit parallel port connector. A parallel port card is an optional card on the Apple //s, and is required in order to interface to the Etherbox. The parallel port connector is a female DB-25 connector that has pin 7 blocked so that an RS232C connector can not mistakenly be inserted in the connector. The interface cable for the connection will be provided with the Etherbox and will have a maximum length of six feet.

The Etherbox can be connected to Ethernet through one of two interfaces: a standard Ethernet transceiver interface or an RG-58 Ethernet "Thin Cable" interface. A switch is provided for defining the type of Ethernet connecting to (RG-58, or standard).

The standard Ethernet transceiver interface connector is a female DA-15 DIX connector with slide lock. An Ethernet drop cable that can be up to 100 feet in length can be attached to this connector. The other end of the drop cable attaches to any Ethernet transceiver, which in turn attaches to the standard Ethernet RG8U ("Yellow") Network cable. The Ethernet transceiver for use with this connector must be purchased separately. Standard Ethernet transceivers can be purchased from 3COM, or TCL as well as several other vendors.

The other Ethernet interface uses an onboard transceiver and is designed to be used with low-cost (50 ohm) RG-58A/U "Thin Cable". The onboard transceiver is attached to the "Thin Cable" via a single, female BNC connector on the rear of the box that is mated to a BNC "T" connector that is pre-installed on the "Thin Cable". The Etherbox can be coupled and uncoupled from the network without affecting network operations.

The RG-58 "Thin" cable is electrically compatible with the standard Ethernet "Yellow" cable. The RG-58 can in fact be attached to a "Yellow" Ethernet cable by simply coupling them with an N-series/BNC adapter, thus allowing the Etherbox to communicate with any other station on the RG-58 or "Yellow" cables. The RG-58 cable is thinner, more flexible, and less expensive than standard Ethernet cable, but limits the length of a network segment to 330 meters instead of the 500 meters obtainable with standard "Yellow" cable.

Availability

The Etherbox will be available in late 1983 through Apple's National Accounts program and qualified Apple dealers.

Etherbox Questions and Answers

Etherbox Marketing Questions

Q - Who will market the Etherbox ?

A - The Etherbox will be marketed by Apple National Account Execs and qualified dealers.

Q - Who will install the Etherbox ?

A - The Etherbox can be installed by the customer or Apple dealer. For larger installations RCA Service can be contracted to provide installation support.

Q - When will Etherbox be available ?

A - The Etherbox will be introduced (demonstrated) late summer 1983. Etherbox will be available to end users late 1983.

Q - What Apple products will be supported by Etherbox ?

A - Apple //, Apple ///, and Lisa.

Q - Will users be able to interface to Xerox File Servers, Print Servers, or Communication Servers through the Etherbox ?

A - Communication with these Xerox servers requires serveral higher-level interface protocols that Xerox has not yet published.

Q - Will a European version of the Etherbox be offered ?

A - A separate version of Etherbox will be manufactured for European markets. The only difference will be the line voltage and frequency.

Etherbox Technical Questions

Q - Is Etherbox truly Ethernet compatible ?

A - Etherbox conforms to the Ethernet Specification, Version 1.0, 30 September 1980, as published by DEC, Intel, and Xerox.

Q - What technology is the Etherbox based on ?

A - The design is based on a VLSI Ethernet Data Link Controller integrated circuit (EDLC) and 3COM transceiver.

Q - Is Etherbox safety certified ?

A - Etherbox will be UL certified under UL 114 (Office Machines) and UL 478 (Data Processing Equipment).

Q - Is Etherbox electromagnetically certified ?

A - Etherbox will be certified as a Class A device under FCC Part 15, Subpart J for radiated and conducted emissions.

Q - What functions are performed by Etherbox ?

A - The Etherbox implements Level 0 of the Xerox Network Systems protocols. This translates to Layer 1 and Layer 2 of the ISO Reference Model:

Layer 1

- Electrical isolation between coax aand workstation
- Bit transmission and reception
- Carrier sensing
- Transmit collision detection
- Signal encoding and decoding
- Packet preamble generation and removal.

Layer 2

- 32-bit CRC generation and checking
- Carrier deference
- Transmit collision enforcement
- Collision fragment filtering
- Bad packet filtering
- Address recognition.

Q - Does Etherbox provide buffering ?

A - Etherbox has three 2K byte buffers that are permanently assigned; two are assigned as receive buffers and one as a transmit buffer. The buffers are large enough for any legal size Ethernet packet.

Data Communications Questions & Answers

Overview

1. What is the Apple's data communications strategy for Lisa?

Apple intends to provide Lisa with the capabilities to communicate with as wide a range of remote computers as possible. The ability for personal office computers to exchange information with other information systems is a central characteristic of the automated office.

2. What products will be available when Lisa ships?

LisaTerminal will be available at the same time as Lisa. Other data communication packages will follow later during 1983.

LisaTerminal

3. What is LisaTerminal?

LisaTerminal is a software product that allows Lisa to communicate using asynchronous protocol with other computers. Specifically, it allows Lisa to emulate TTY, VT52, and VT100 terminals, giving Lisa the ability to exchange data with remote computers. LisaTerminal is an integrated Lisa application, and is part of the Lisa Office System family of applications.

4. What do you mean when you say LisaTerminal is "integrated"?

LisaTerminal is integrated in that it allows users to "copy and paste" or exchange information with other Lisa applications, specifically, LisaWrite and LisaCalc.

5. What Lisa Office applications is LisaTerminal not "integrated" with?

LisaGraph, LisaDraw, LisaProject, LisaList

6. Does LisaTerminal support synchronous modems?

LisaTerminal only operates with asynchronous modems.

7. How will Lisa interact with the Apple Cluster Controller?

LisaTerminal, Lisa's asynchronous communications application, will attach locally via direct cable or remotely, via communications lines, to the Apple Cluster Controller. LisaTerminal can be defined as a TTY or VT100 device to the Cluster Controller, which will convert LisaTerminal messages into IBM 3270 format and vice-versa.

8. Does that mean that a user can effectively "copy and paste" IBM host information with LisaWrite, or send LisaCalc information to the IBM computer?

Yes.

9. Does it matter that the IBM host is running BSC (bisynchronous) or SDLC/SNA 3270 protocol?

The Apple Cluster Controller will convert messages from LisaTerminal into either 3270-BSC or 3270-SNA format.

10. What advantages does a LisaTerminal and Apple Cluster Controller combination provide the user?

Using the Apple Cluster Controller, users can copy and paste, or exchange information between IBM computers and the Lisa. In other words, data from IBM computers can be integrated with other Lisa applications.

11. What advantages does LisaTerminal have over ordinary terminals and display devices?

LisaTerminal allows you to save, print, and use host information in other Lisa applications, such as LisaWrite.

IBM Communications

12. What IBM communications capabilities will the Lisa have?

Lisa will have 3270-BSC and 3270-SNA communications packages that will allow users to interact with other IBM computers. In addition, LisaTerminal used with the Apple Cluster Controller will allow cost-effective attachment of multiple Lisas to IBM computers.

13. When will IBM communications be available?

The Apple Cluster Controller and 3270-BSC Communications Package will be available in the summer of 1983. The 3270-SNA Communications Package will be available shortly after that.

14. Which models of the IBM 3271 will the 3270-BSC package emulate?

The BSC Package will emulate an IBM 3271 Model 2 running one 3277 display.

15. Which models of the IBM 3274 will the 3270-SNA Communications Package

emulate?

That product will emulate the IBM 3274 Model 51C running one 3278 display.

16. Can you multidrop Lisas running the IBM Communications Packages?

Yes.

17. Will the IBM 3270 Communications Packages be hardware or software?

The products are software programs. Communications hardware has been built into the Lisa.

Miscellaneous

18. What communications hardware is built into the Lisa?

Lisa has 2 serial RS232C ports and a programmable communications chip, or UART.

19. Does Lisa have a built-in modem?

No. Users will have to acquire their own modems in order to use the Lisa data communications products.

20. How does a customer order Lisa data communications products?

See your local dealer or Apple salesperson.

International Questions and Answers

1. Will Lisa be available abroad?

Shortly after Lisa is shipped in the U.S. this spring, it will be available for limited distribution with an international (220V) power supply in Europe and elsewhere. However, our international plans are far more comprehensive in scope: in very short order, we will offer a series of localized versions of Lisa in each of the major markets of the world, each of them variants of a basic hardware and software architecture designed to make Lisa fully international as well as fully localized.

2. When will your international products be available?

Fully localized versions of Lisa for the UK, France and Germany will be available in the summer of 1983. Other versions will follow progressively.

3. What do you mean by "fully localized"?

As far as hardware, each localized version will have its own keyboard featuring the character configuration appropriate to that market. As far as software, all of Lisa's extensive and highly developed user interface will be translated, as will the comprehensive manuals and other documentation that make Lisa unprecedentedly user-friendly. We also plan to accommodate local data conventions, such as localized formats for numbers, currency, dates, and time.

4. In what sense will localized versions also remain "fully international"?

Any Lisa will be compatible with all localized keyboards; on being plugged in, each localized keyboard will "identify itself" to the computer. In addition, each keyboard has an option key which acts like a super shift to give access to a complete set of additional characters called the "Alternate Keyboard". It includes common mathematical symbols, but also all of the foreign characters (accents, letters) found on any other localized keyboard. For example, this will make it possible for a German-speaking user of Lisa to draft a letter in German to a correspondent in France, with all of the right accents in both of their respective languages, on an English Lisa.

5. Does Lisa comply with international standards?

Lisa is designed to comply with IEC and VDE safety standards.

6. Will there be transferrability of documents among different localized versions?

This point will be addressed in the formal introduction of the localized versions this Spring.

Service and Support Questions

1. What warranties will come standard with the Lisa?

Standard Hardware Warranty.
The Lisa will be covered by the standard 90-day parts and labor warranty. The terms of this warranty will require the customer to return defective equipment to an Apple Authorized Service outlet, unless the warranty was upgraded under the provisions of an on-site maintenance contract.

Standard Software Warranty.
The Lisa software will be covered by the standard 90-day defective media warranty.

2. What other technical support and service is standard when you buy the Lisa?

Telephone Support.
Each Lisa system will carry enough access time to Apple's Technical Support Organization (through an 800 number) to support the primary user through the 90-day warranty period. Technicians will provide immediate answers to basic operator questions on the Lisa applications and languages.

Software Updates.
The first update to the Lisa's applications software will be included in the price of the system.

3. How about system installation?

Any Apple direct sale or National Account customers may elect the Lisa system installation at their site. Dealer direct sale customers may elect on-site installation if the dealer provides such service, or if customers purchase an RCA on-site maintenance contract. Installation includes:

- interconnection of system, peripherals, and power source;
- operating system configuration;
- software loading onto ProFile;
- verification of proper system operation; and
- some operator training.

Dealers who do not provide on-site installation will set up, configure, and check out systems in the dealership prior to customer delivery.

4. If I buy the Lisas directly from Apple, who will service my equipment?

Apple direct sale customers will have three hardware support options:

1. RCA On-Site Maintenance. RCA is Apple's exclusive third-party, on-site maintenance vendor with 200 service offices located in the continental United States and Puerto Rico. For customers within 100 miles of an RCA service center, RCA guarantees 4-hour response between 8 A.M. and 5 P.M., Monday through Friday. Users with on-site service contracts can elect extended-hour service.

2. Servicing Owner. This program was developed for those customers geographically remote from Authorized Dealers or running critical applications which cannot afford the downtime associated with other repair programs. Servicing owners are treated very much like Level I dealers. They receive identical training and may purchase spares direct from Apple.

3. Authorized Dealer Service Program. All direct sale customers have the option of purchasing service through the Apple dealer network. These programs include Dealer On-site Service, AppleCare Carry-In Service, or time and materials carry-in repair.

5. What hardware service alternatives will be available from the Personal Office Systems Dealers?

Although the range of service and support programs differ from dealership to dealership, typical programs include:

1. On-Site Maintenance. Dealers who offer on-site service design their own service contracts to meet the needs of the mix of customers they support.

2. AppleCare Carry-In Service. Through the dealer network, Apple will offer customers a fixed price, one-year, system maintenance contract. Customers can purchase an AppleCare Carry-In contract at any authorized Apple Personal Office Systems Dealer and may bring defective equipment into any Authorized POSD for repair. The goal is while-you-wait service.

3. Authorized Personal Office Systems Service. Every dealer who sells the Lisa can provide carry-in service on the unit.

6. How can I be sure that I have the latest software revision?

The AppleCare Software Assurance Program (ASAP) has been instituted to provide software and documentation updates. A mailing list will be compiled from the returned software license agreements. When updates become available, customers will be notified and offered the opportunity to purchase the update for a small administrative fee. Subscription to the first Lisa software and documentation upgrade will come with the system.